Math 220 Assignment

November 2, 2001

Due Monday, November 5

1. What is the length of the line segment from the point $(2, -1, 1)$ to the point $(4, -4, 7)$?

2. What is the angle at the point $(0, 1, -1)$ in the triangle whose vertices are that point, the point $(-1, 3, 1)$, and the point $(3, 7, -3)$?

3. Let M be the 2×3 matrix
$$M = \begin{pmatrix} 3 & 0 & -1 \\ 3 & -2 & 0 \end{pmatrix},$$
and let f be the linear function from $\mathbf{R}^3$ to $\mathbf{R}^2$ that is defined by $f(x) = Mx$. Find a basis of the kernel of f consisting of vectors of length 1.

4. Find a basis consisting of mutually perpendicular vectors for the plane in $\mathbf{R}^3$ defined by the linear equation
$$2x - y + 2z = 0 \quad .$$

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